RAW SEQUENCE LISTING

The Biotechnology Systems Branch of the Scientific and Technical Information Center (STIC) no errors detected.

Application Serial Number: _____10/552,127_____

Source: _____PCT_____

Date Processed by STIC: _____10/18/2005_____

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        RAW SEQUENCE LISTING              DATE: 10/18/2005
        PATENT APPLICATION:  US/10/552,127    TIME: 10:15:48

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     3 <110> APPLICANT: Cirpus, Petra
     4        Bauer, Jorg
     5        Meyer, Astrid
     6        Heinz, Ernst
     7        Zahringer, Ulrich
     9 <120> TITLE OF INVENTION: DELTA-4 DESATURASES FROM EUGLENA GRACILIS, EXPRESSING
PLANTS, AND
    10        OILS CONTAINING PUFA
    12 <130> FILE REFERENCE: 12810-00136-US
C--> 14 <140> CURRENT APPLICATION NUMBER: US/10/552,127
C--> 14 <141> CURRENT FILING DATE: 2005-10-05
    14 <150> PRIOR APPLICATION NUMBER: PCT/EP2004/003628
    15 <151> PRIOR FILING DATE: 2004-04-06
    17 <150> PRIOR APPLICATION NUMBER: DE 103 16 267.4
    18 <151> PRIOR FILING DATE: 2003-04-08
    20 <160> NUMBER OF SEQ ID NOS: 7
    22 <170> SOFTWARE: PatentIn version 3.3
    24 <210> SEQ ID NO: 1
    25 <211> LENGTH: 1626
    26 <212> TYPE: DNA
    27 <213> ORGANISM: Euglena gracilis
    29 <220> FEATURE:
    30 <221> NAME/KEY: CDS
    31 <222> LOCATION: (1)..(1623)
    32 <223> OTHER INFORMATION: Delta-4-Desaturase
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    37 1               5                   10                  15
    39 aac ggc aag ccg gag aac gga gcc acc cct gag aac gga gcg aag ccg      96
    40 Asn Gly Lys Pro Glu Asn Gly Ala Thr Pro Glu Asn Gly Ala Lys Pro
    41             20                  25                  30
    43 caa cct tgc gag aac ggc acg gtg gaa aag cga gag aat gac acc gcc     144
    44 Gln Pro Cys Glu Asn Gly Thr Val Glu Lys Arg Glu Asn Asp Thr Ala
    45          35                  40                  45
    47 aac gtt cgg ccc acc cgt cca gct gga ccc ccg ccg gcc acg tac tac     192
    48 Asn Val Arg Pro Thr Arg Pro Ala Gly Pro Pro Pro Ala Thr Tyr Tyr
    49     50                  55                  60
    51 gac tcc ctg gca gtg tcg ggg cag ggc aag gag cgg ctg ttc acc acc     240
    52 Asp Ser Leu Ala Val Ser Gly Gln Gly Lys Glu Arg Leu Phe Thr Thr
    53 65                  70                  75                  80
    55 gat gag gtg agg cgg cac atc ctc ccc acc gat ggc tgg ctg acg tgc     288
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60 His Glu Gly Val Tyr Asp Val Thr Asp Phe Leu Ala Lys His Pro Gly
61         100             105             110
63 ggc ggt gtc atc acg ctg ggc ctt gga agg gac tgc aca atc ctc atc    384
64 Gly Gly Val Ile Thr Leu Gly Leu Gly Arg Asp Cys Thr Ile Leu Ile
65         115             120             125
67 gag tca tac cac cct gct ggg cgc ccg gac aag gtg atg gag aag tac    432
68 Glu Ser Tyr His Pro Ala Gly Arg Pro Asp Lys Val Met Glu Lys Tyr
69     130             135             140
71 cgc att ggt acg ctg cag gac ccc aag acg ttc tat gct tgg gga gag    480
72 Arg Ile Gly Thr Leu Gln Asp Pro Lys Thr Phe Tyr Ala Trp Gly Glu
73 145             150             155             160
75 tcc gat ttc tac cct gag ttg aag cgc cgg gcc ctt gca agg ctg aag    528
76 Ser Asp Phe Tyr Pro Glu Leu Lys Arg Arg Ala Leu Ala Arg Leu Lys
77             165             170             175
79 gag gct ggt cag gcg cgg cgc ggc ggc ctt ggg gtg aag gcc ctc ctg    576
80 Glu Ala Gly Gln Ala Arg Arg Gly Gly Leu Gly Val Lys Ala Leu Leu
81             180             185             190
83 gtg ctc acc ctc ttc ttc gtg tcg tgg tac atg tgg gtg gcc cac aag    624
84 Val Leu Thr Leu Phe Phe Val Ser Trp Tyr Met Trp Val Ala His Lys
85             195             200             205
87 tcc ttc ctc tgg gcc gcc gtc tgg ggc ttc gcc ggc tcc cac gtc ggg    672
88 Ser Phe Leu Trp Ala Ala Val Trp Gly Phe Ala Gly Ser His Val Gly
89     210             215             220
91 ctg agc atc cag cac gat ggc aac cac ggc gcg ttc agc cgc aac aca    720
92 Leu Ser Ile Gln His Asp Gly Asn His Gly Ala Phe Ser Arg Asn Thr
93 225             230             235             240
95 ctg gtg aac cgc ctg gcg ggg tgg ggc atg gac ttg atc ggc gcg tcg    768
96 Leu Val Asn Arg Leu Ala Gly Trp Gly Met Asp Leu Ile Gly Ala Ser
97             245             250             255
99 tcc acg gtg tgg gag tac cag cac gtc atc ggc cac cac cag tac acc    816
100 Ser Thr Val Trp Glu Tyr Gln His Val Ile Gly His His Gln Tyr Thr
101             260             265             270
103 aac ctc gtg tcg gac acg cta ttc agt ctg cct gag aac gat ccg gac    864
104 Asn Leu Val Ser Asp Thr Leu Phe Ser Leu Pro Glu Asn Asp Pro Asp
105             275             280             285
107 gtc ttc tcc agc tac ccg ctg atg cgc atg cac ccg gat acg gcg tgg    912
108 Val Phe Ser Ser Tyr Pro Leu Met Arg Met His Pro Asp Thr Ala Trp
109     290             295             300
111 cag ccg cac cac cgc ttc cag cac ctg ttc gcg ttc cca ctg ttc gcc    960
112 Gln Pro His His Arg Phe Gln His Leu Phe Ala Phe Pro Leu Phe Ala
113 305             310             315             320
115 ctg atg aca atc agc aag gtg ctg acc agc gat ttc gct gtc tgc ctc   1008
116 Leu Met Thr Ile Ser Lys Val Leu Thr Ser Asp Phe Ala Val Cys Leu
117             325             330             335
119 agc atg aag aag ggg tcc atc gac tgc tcc tcc agg ctc gtc cca ctg   1056
120 Ser Met Lys Lys Gly Ser Ile Asp Cys Ser Ser Arg Leu Val Pro Leu
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123 gag ggg cag ctg ctg ttc tgg ggg gcc aag ctg gcg aac ttc ctg ttg   1104
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124 Glu Gly Gln Leu Leu Phe Trp Gly Ala Lys Leu Ala Asn Phe Leu Leu
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127 cag att gtg ttg cca tgc tac ctc cac ggg aca gct atg ggc ctg gcc    1152
128 Gln Ile Val Leu Pro Cys Tyr Leu His Gly Thr Ala Met Gly Leu Ala
129     370                 375                 380
131 ctc ttc tct gtt gct cac ctt gtg tcg ggg gag tac ctc gcg atc tgc    1200
132 Leu Phe Ser Val Ala His Leu Val Ser Gly Glu Tyr Leu Ala Ile Cys
133 385                 390                 395                 400
135 ttc atc atc aac cac atc agc gag tct tgt gag ttt atg aat aca agc    1248
136 Phe Ile Ile Asn His Ile Ser Glu Ser Cys Glu Phe Met Asn Thr Ser
137                 405                 410                 415
139 ttt caa acc gcc gcc cgg agg aca gag atg ctt cag gca gca cat cag    1296
140 Phe Gln Thr Ala Ala Arg Arg Thr Glu Met Leu Gln Ala Ala His Gln
141         420                 425                 430
143 gca gcg gag gcc aag aag gtg aag ccc acc cct cca ccg aac gat tgg    1344
144 Ala Ala Glu Ala Lys Lys Val Lys Pro Thr Pro Pro Pro Asn Asp Trp
145         435                 440                 445
147 gct gtg aca cag gtc caa tgc tgc gtg aat tgg aga tca ggt ggc gtg    1392
148 Ala Val Thr Gln Val Gln Cys Cys Val Asn Trp Arg Ser Gly Gly Val
149     450                 455                 460
151 ttg gcc aat cac ctc tct gga ggc ttg aac cac cag atc gag cat cat    1440
152 Leu Ala Asn His Leu Ser Gly Gly Leu Asn His Gln Ile Glu His His
153 465                 470                 475                 480
155 ctg ttc ccc agc atc tcg cat gcc aac tac ccc acc atc gcc cct gtt    1488
156 Leu Phe Pro Ser Ile Ser His Ala Asn Tyr Pro Thr Ile Ala Pro Val
157                 485                 490                 495
159 gtg aag gag gtg tgc gag gag tac ggg ttg ccg tac aag aat tac gtc    1536
160 Val Lys Glu Val Cys Glu Glu Tyr Gly Leu Pro Tyr Lys Asn Tyr Val
161         500                 505                 510
163 acg ttc tgg gat gca gtc tgt ggc atg gtt cag cac ctc cgg ttg atg    1584
164 Thr Phe Trp Asp Ala Val Cys Gly Met Val Gln His Leu Arg Leu Met
165         515                 520                 525
167 ggt gct cca ccg gtg cca acg aac ggg gac aaa aag tca taa            1626
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169         530                 535                 540
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174 <212> TYPE: PRT
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184             20                  25                  30
187 Gln Pro Cys Glu Asn Gly Thr Val Glu Lys Arg Glu Asn Asp Thr Ala
188         35                  40                  45
191 Asn Val Arg Pro Thr Arg Pro Ala Gly Pro Pro Pro Ala Thr Tyr Tyr
192     50                  55                  60
195 Asp Ser Leu Ala Val Ser Gly Gln Gly Lys Glu Arg Leu Phe Thr Thr
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196 65                        70                    75                        80
199 Asp Glu Val Arg Arg His Ile Leu Pro Thr Asp Gly Trp Leu Thr Cys
200               85                    90                    95
203 His Glu Gly Val Tyr Asp Val Thr Asp Phe Leu Ala Lys His Pro Gly
204               100                   105                   110
207 Gly Gly Val Ile Thr Leu Gly Leu Gly Arg Asp Cys Thr Ile Leu Ile
208           115                   120                   125
211 Glu Ser Tyr His Pro Ala Gly Arg Pro Asp Lys Val Met Glu Lys Tyr
212       130                   135                   140
215 Arg Ile Gly Thr Leu Gln Asp Pro Lys Thr Phe Tyr Ala Trp Gly Glu
216 145                   150                   155                   160
219 Ser Asp Phe Tyr Pro Glu Leu Lys Arg Arg Ala Leu Ala Arg Leu Lys
220               165                   170                   175
223 Glu Ala Gly Gln Ala Arg Arg Gly Gly Leu Gly Val Lys Ala Leu Leu
224           180                 ·  185                   190
227 Val Leu Thr Leu Phe Phe Val Ser Trp Tyr Met Trp Val Ala His Lys
228           195                   200                   205
231 Ser Phe Leu Trp Ala Ala Val Trp Gly Phe Ala Gly Ser His Val Gly
232       210                   215                   220
235 Leu Ser Ile Gln His Asp Gly Asn His Gly Ala Phe Ser Arg Asn Thr
236 225                   230                   235                   240
239 Leu Val Asn Arg Leu Ala Gly Trp Gly Met Asp Leu Ile Gly Ala Ser
240               245                   250                   255
243 Ser Thr Val Trp Glu Tyr Gln His Val Ile Gly His His Gln Tyr Thr
244           260                   265                   270
247 Asn Leu Val Ser Asp Thr Leu Phe Ser Leu Pro Glu Asn Asp Pro Asp
248           275                   280                   285
251 Val Phe Ser Ser Tyr Pro Leu Met Arg Met His Pro Asp Thr Ala Trp
252       290                   295                   300
255 Gln Pro His His Arg Phe Gln His Leu Phe Ala Phe Pro Leu Phe Ala
256 305                   310                   315                   320
259 Leu Met Thr Ile Ser Lys Val Leu Thr Ser Asp Phe Ala Val Cys Leu
260           325                   330                   335
263 Ser Met Lys Lys Gly Ser Ile Asp Cys Ser Ser Arg Leu Val Pro Leu
264           340                   345                   350
267 Glu Gly Gln Leu Leu Phe Trp Gly Ala Lys Leu Ala Asn Phe Leu Leu
268           355                   360                   365
271 Gln Ile Val Leu Pro Cys Tyr Leu His Gly Thr Ala Met Gly Leu Ala
272       370                   375                   380
275 Leu Phe Ser Val Ala His Leu Val Ser Gly Glu Tyr Leu Ala Ile Cys
276 385                   390                   395                   400
279 Phe Ile Ile Asn His Ile Ser Glu Ser Cys Glu Phe Met Asn Thr Ser
280           405                   410                   415
283 Phe Gln Thr Ala Ala Arg Arg Thr Glu Met Leu Gln Ala Ala His Gln
284           420                   425                   430
287 Ala Ala Glu Ala Lys Lys Val Lys Pro Thr Pro Pro Asn Asp Trp
288           435                   440                   445
291 Ala Val Thr Gln Val Gln Cys Cys Val Asn Trp Arg Ser Gly Gly Val
292       450                   455                   460
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295 Leu Ala Asn His Leu Ser Gly Gly Leu Asn His Gln Ile Glu His His
296 465             470             475             480
299 Leu Phe Pro Ser Ile Ser His Ala Asn Tyr Pro Thr Ile Ala Pro Val
300             485             490             495
303 Val Lys Glu Val Cys Glu Glu Tyr Gly Leu Pro Tyr Lys Asn Tyr Val
304             500             505             510
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337 <222> LOCATION: (1)..(25)
338 <223> OTHER INFORMATION: Reverse primer for cloning the shorter reading frame (SEQ ID
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339      1) into the vector pYES2
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348 <213> ORGANISM: Unknown
350 <220> FEATURE:
351 <221> NAME/KEY: misc_feature
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353 <223> OTHER INFORMATION: Forward primer for introducing NotI cleavage sites at the 5'
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354      of the coding sequence
356 <400> SEQUENCE: 5
357 gcggccgcat gttggtgctg tttggcaa                                  28
360 <210> SEQ ID NO: 6
361 <211> LENGTH: 25
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363 <213> ORGANISM: Unknown
365 <220> FEATURE:
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VERIFICATION SUMMARY   DATE: 10/18/2005
PATENT APPLICATION: US/10/552,127   TIME: 10:15:49

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Output Set: **N:\CRF4\10182005\J552127.raw**

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L:14 M:271 C: Current Filing Date differs, Replaced Current Filing Date